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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/534,378

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Tsuneharu Tomita

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EXAMINER

SNYDER, ZACHARY J

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4135

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/534,378	<b>Applicant(s)</b> TOMITA ET AL.	
	<b>Examiner</b> Zachary Snyder	<b>Art Unit</b> 4135	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 09 May 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 5/9/2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/9/2005</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Specification***

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited.

The disclosure is objected to because of the following informalities:

“...the size of pixel 6 varies large depending on the position accuracy...” on page 3, lines 4 and 5 is suggested to be changed to “...the size of pixel 6 varies largely depending on the position accuracy...”;

“When such organic light emitting element...” on page 3, line 20 is suggested to be changed to “When such an organic light emitting element...”;

“...the invention applies following means,” on page 3, line 30 is suggested to be changed to “...the invention applies the following means,”; and

“...metal layer thus reducing in thick may be formed...” on page 5, line 7 is suggested to be changed to “...metal layer thus reducing in thickness may be formed...”.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6, 8-12, and 14-20 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 2000-091083 to Naoki et al.

In regard to claim 1, Naoki discloses a production method of an organic light emitting element comprising steps of forming each layer of a transparent electrode (translucent part 12a functions as the anode, paragraph 18, Figure 1a-b) and a metal layer (metallic material part 12b, paragraph 18) sequentially on a transparent substrate (transparent substrate 11, paragraph 17);

forming a first electrode composed of the transparent electrode and the metal layer (anode part 12 composed of wrap metallic part 12b and transparent electrical conducting material part 12a, paragraph 18);

removing the metal layer (metallic part 12b is etched into tapered shape, paragraph 23) of an area corresponding to a pixel (light emitting area between metallic parts 12b is defined by this etching of 12b into a tapered shape) of the first electrode to expose the transparent electrode (translucent part 12a);

forming an organic layer (organic layer 13, paragraph 17) to coat the exposed transparent electrode (translucent part 12a);

and forming a second electrode (cathode wiring part 14, paragraph 17) on the organic layer.

In regard to claim 2, Naoki discloses the production method of an organic light emitting element as defined in claim 1, and that the metal layer (metallic part 12b) is formed of a metal that can be etched (12b is etched into tapered shape, paragraph 23) instead of the transparent electrode (translucent part 12a).

Naoki does not specifically state that the etching can be performed selectively. The applicant has identified in the specification that when ITO is used as the transparent electrode (Naoki's translucent part 12a), it is possible and desirable to use Cu, Al, or Ag as the material of the metal layer (Naoki's metallic part 12b). Naoki shows in Table 1 several metals that are acceptable to be used as the metallic part 12b and this table includes Ag, Al, and Cu and states that ITO is used as the transparent electrode (paragraph 19). Since the applicant states that the metals selected to be used as the metal layer in his invention can be selectively etched and later discloses Cu, Al, and Ag as possible elements for the claimed metal layer, it is reasonable to assume that Naoki's metallic part 12b can also be selectively etched when using Ag, Al, or Cu.

In regard to claim 3, Naoki discloses the production method of an organic light emitting element as defined in claim 1, but does not specifically state that the metal layer (metallic part 12b) is formed of a metal having a work function smaller than a work function of the material of the transparent electrode (translucent part 12a).

Applicant has identified in the specification that when ITO is used as the transparent electrode (Naoki's translucent part 12a), it is possible and desirable to use Cu, Al, or Ag as the material of the metal layer (Naoki's metallic part 12b). Naoki shows in Table 1 several metals that are acceptable to be used as the metallic part 12b and this table includes Ag, Al, and Cu and

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states that ITO is used as the transparent electrode (paragraph 19). Since the applicant states that the metals selected to be used as the metal layer in his invention have a work function smaller than the material of the transparent electrode and later discloses Cu, Al, and Ag as possible elements for the claimed metal layer, it is reasonable to assume that Naoki's metallic part 12b will have a work function that is smaller than the work function of the translucent part 12a when using Ag, Al, or Cu.

In regard to claim 4, Naoki discloses the production method of an organic light emitting element as defined in claim 1 further comprising a step of forming an insulating layer (referred to as inorganic insulating film, but not labeled in drawings, and this silicon nitride inorganic insulating layer is formed between organic layer 13 and anode parts 12, paragraph 36) on an upper surface of the metal layer (anode metallic part 12b).

In regard to claim 6, Naoki discloses the production method of an organic light emitting element as defined in claim 1 and that the step of removing the metal layer (metallic part 12b) further comprises steps of providing the metal layer with a portion reducing in thickness toward the pixel edge (metal part 12b is etched into tapered shape, paragraph 23, shown in figure 1a), and

forming at the pixel edge a stair of the metal layer (metallic part 12b) on the transparent electrode (translucent part 12a) so as to have a thickness not more than that of the organic layer (metallic part 12b is tapered and is reducing in width down to a point. At this point, and possibly before that, metallic layer 12b will be less in thickness than the organic layer 13).

In regard to claim 8, Naoki discloses the production method of an organic light emitting element as defined in claim 6 and that the portion thus reducing (metallic part 12b) is a stepped form that the thickness reduces gradually toward the pixel edge (The metallic part 12b is tapered at some non-disclosed angle and in a mathematical mind-set comprised of tiny steps gradually reducing in thickness).

In regard to claim 9, Naoki discloses the production method of an organic light emitting element as defined in claim 1 and that the first electrode (anode 12) is a grid-shaped electrode separated electrically (grid-shape is shown in figure 1b, the pixel size corresponds to 12a and does not vary),

and the step of removing the metal layer further comprises a step of removing the metal layer in a form of strip so as to cross (drawing 1a shows tapered metallic part 12b cross section) the grid-shaped electrode (anode wires part 12 is formed in the stripe shape and confined by metallic part 12b which is etched into its tapered shape, paragraph 18 and drawing 1b).

In regard to claim 10, Naoki discloses an organic light emitting element comprising  
a transparent electrode (translucent part 12a) formed on a transparent substrate (transparent substrate 11);

a metal layer formed removing an area (metallic part 12b is etched into tapered shape, paragraph 23, Figure 1a-b) corresponding to a pixel (area between metallic parts 12b is defined by this etching of 12b into a tapered shape) on the transparent electrode (translucent part 12a);

an organic layer (organic layer 13, paragraph 17) coating the area corresponding to the pixel; and

a second layer (cathode wiring part 14, paragraph 17) formed on the organic layer.

In regard to claim 11, Naoki discloses the organic light emitting element as defined in claim 10, wherein an insulating layer (referred to as inorganic insulating film, but not labeled in drawings, and this silicon nitride inorganic insulating layer is formed between organic layer 13 and anode parts 12, paragraph 36) is formed on the upper surface of the metal layer (metallic part 12b).

In regard to claim 12, Naoki discloses the organic light emitting element as defined in claim 10 and that the metal layer (metallic part 12b) is provided with a portion reducing in thickness toward the pixel edge (metal part 12b is etched into tapered shape, paragraph 23, shown in figure 1a),

and a stair of the metal layer on the transparent electrode is formed at the pixel edge so as to have a thickness not more than that of the organic layer (metallic part 12b is tapered and is reducing in width down to a point. At this point, and possibly before that, metallic layer 12b will be less in thickness than the organic layer 13).

In regard to claim to claim 14, Naoki discloses the organic light emitting element as defined in claim 12 and that the portion thus reducing (metallic part 12b) is a stepped form that the thickness reduces gradually toward the pixel edge (The metallic part 12b is tapered at some

non-disclosed angle and in a mathematical mind-set comprised of tiny steps gradually reducing in thickness).

In regard to claim 15, Naoki discloses the organic light emitting element as defined claim 10 and that the transparent electrode (translucent part 12a) is a grid-shaped electrode separated electrically (grid-shape is shown in figure 1b, the pixel size corresponds to 12a and does not vary).

In regard to claim 16, Naoki discloses an image forming device using the light emitting element defined in claim 15 as a light source thereof (the invention relates to an organic electroluminescence display, paragraph 1).

In regard to claim 17, Naoki discloses a display unit using the light emitting element defined in claim 15 (the invention relates to an organic electroluminescence display, paragraph 1).

In regard to claim 18, Naoki discloses the production method of an organic light emitting element as defined in claim 2 and that the first electrode (translucent part 12a) is a grid-shaped electrode separated electrically (grid-shape is shown in figure 1b, the pixel size corresponds to 12a and does not vary),

and the step of removing the metal layer further comprises a step of removing the metal layer in a form of strip so as to cross (drawing 1a shows tapered metallic part 12b cross section)

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the grid-shaped electrode (anode wires part 12 is formed in the stripe shape and confined by metallic part 12b which is etched into its tapered shape, paragraph 18 and drawing 1b).

In regard to claim 19, Naoki discloses the production method of an organic light emitting element as defined in claim 3 and that the first electrode (translucent part 12a) is a grid-shaped electrode separated electrically (grid-shape is shown in figure 1b, the pixel size corresponds to 12a and does not vary),

and the step of removing the metal layer further comprises a step of removing the metal layer in a form of strip so as to cross (drawing 1a shows tapered metallic part 12b cross section) the grid-shaped electrode (anode wires part 12 is formed in the stripe shape and confined by metallic part 12b which is etched into its tapered shape, paragraph 18 and drawing 1b).

In regard to claim 20, Naoki discloses the production method of an organic light emitting element as defined in claim 3 and that the first electrode (translucent part 12a) is a grid-shaped electrode separated electrically (grid-shape is shown in figure 1b, the pixel size corresponds to 12a and does not vary),

and the step of removing the metal layer further comprises a step of removing the metal layer in a form of strip so as to cross (drawing 1a shows tapered metallic part 12b cross section) the grid-shaped electrode (anode wires part 12 is formed in the stripe shape and confined by metallic part 12b which is etched into its tapered shape, paragraph 18 and drawing 1b).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 7, and 13 rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2000-091083 to Naoki et al., as applied to claims 1-4, 6, 8-12, and 14-20 above, in view of U.S. Patent 6,280,861 B1 to Hosokawa et al.

In regard to claim 5, Naoki discloses the production method of an organic light emitting element as defined in claim 1.

Naoki's metal layer does have some thickness, but it is not specifically stated that the step of removing the metal layer further comprises a step of forming the metal layer to be not more than 3 micrometers thick at the pixel edge.

Hosokawa discloses an organic EL device wherein the production method comprises the steps of forming a transparent electrode on a substrate and then forming an organic layer containing an organic light-emitting material on the transparent electrode (COL. 4, LINE 3-7). The transparent electrode has an amorphous electrically conductive oxide layer and the organic layer is formed on the amorphous electrically conductive oxide layer (COL. 4, LINE 13-15 and 18-20) so the amorphous electrically conductive oxide layer must be formed on the surface of the transparent electrode opposite of the substrate. Figure 1(a) of Hosokawa shows that the transparent electrode 1 has a side surface 2 formed at some angle  $\Theta_1$ . The thickness of the amorphous electrically conductive oxide layer is preferably 500 to 1,000 angstroms (COL. 5, LINE 8-11).

3 micrometers is equivalent to 30,000 angstroms and since Hosokawa's metal layer (amorphous electrically conducting oxide layer which is contains zinc and indium, COL. 4, LINE 21-23) is preferably 1,000 angstroms (0.1 micrometers) at most, it will be less than 3 micrometers thick at the pixel edge.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to form the metal layer of Naoki's invention so that it will be less than 3 micrometers thick at the pixel edge as taught by Hosokawa to achieve low electric resistance and a high light transmittance (COL. 5, LINE 19-22) which is a goal applicant's invention is aspiring to achieve.

In regard to claim 7, Naoki discloses the production method of an organic light emitting element as defined in claim 6.

Naoki's metal layer is reducing towards the pixel edge at some angle but it is not specifically stated that the portion thus reducing is a slanting surface having an angle of 30 or less degrees toward the pixel edge.

Hosokawa discloses an organic EL device wherein the production method comprises the steps of forming a transparent electrode on a substrate and then forming an organic layer containing an organic light-emitting material on the transparent electrode (COL. 4, LINE 3-7). The transparent electrode has an amorphous electrically conductive oxide layer and the organic layer is formed on the amorphous electrically conductive oxide layer (COL. 4, LINE 13-15 and 18-20) so the amorphous electrically conductive oxide layer must be formed on the surface of the transparent electrode opposite of the substrate. Figure 1(a) of Hosokawa shows that the transparent electrode 1 has a side surface 2 formed at some angle  $\Theta_1$ .  $\Theta_1$  is preferably 60 degrees or less or particularly preferably to be 40 degrees or less (COL. 6, LINE 39-41).

In regard to claim 13, Naoki discloses the organic light emitting element as defined in claim 12.

Naoki's metal layer is reducing towards the pixel edge at some angle but it is not specifically stated that the portion thus reducing is a slanting surface having an angle of 30 or less degrees toward the pixel edge.

Hosokawa discloses an organic EL device wherein the production method comprises the steps of forming a transparent electrode on a substrate and then forming an organic layer

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containing an organic light-emitting material on the transparent electrode (COL. 4, LINE 3-7). The transparent electrode has an amorphous electrically conductive oxide layer and the organic layer is formed on the amorphous electrically conductive oxide layer (COL. 4, LINE 13-15 and 18-20) so the amorphous electrically conductive oxide layer must be formed on the surface of the transparent electrode opposite of the substrate. Figure 1(a) of Hosokawa shows that the transparent electrode 1 has a side surface 2 formed at some angle  $\Theta_1$ .  $\Theta_1$  is preferably 60 degrees or less or particularly preferably to be 40 degrees or less (COL. 6, LINE 39-41).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Naoki's production of an organic light emitting element according to the limitations in claims 7 and 13 as taught by Hosokawa because Hosokawa states that thick electrodes will cause problems with "height-level-difference-induced breakage" (COL. 1 & 2, LINE 59-67 & LINE 1-3) and that these specific angles will prevent the "height-level-difference-induced breakage" (COL. 6, LINE 40-43). Therefore Hosokawa establishes that the thickness of the electrode is directly related to this breakage problem and that the angle of the metal layer will prevent the breakage because it will reduce the electrode's thickness. The applicant has stated that the claimed angle of the metal layer's reducing portion will allow the metal layer to be thin (Page 9, Line 14-15). Hosokawa and the applicant are using the same line of reasoning for the claimed angle of metal layer's reducing portion and it has been held that claimed ranges of a result effective variable are unpatentable unless they produce a new and unexpected result. In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996).

These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and In re Aller, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachary Snyder whose telephone number is (571)270-5291. The examiner can normally be reached on Monday through Thursday, 7:30AM to 6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William M. Brewster can be reached on (574)272-1854. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Zachary Snyder/  
Examiner, Art Unit 4135

/Z. S./  
Examiner, Art Unit 4135

/Jessica T Stultz/  
Primary Examiner, Art Unit 4135